

# ***Six-Sigma Approach to Continuous Improvement***

## ***Goal or Objective***

Sometimes referred to as the “new Total Quality management (TQM),” Six-Sigma is a highly rigorous and analytical approach to quality and continuous improvement with an objective to improve profits through defect reduction, yield improvement, improved consumer satisfaction and best-in-class performance.

Six-Sigma means a failure rate of 3.4 parts per million or 99.9997%. At the six standard deviation from the mean under a normal distribution, 99.9996% of the population is under the curve with not more than 3.4 parts per million defective. The higher the sigma value, the less likely a process will produce defects as excellence is approached.

## ***Examples***

Companies such as Honeywell (1994), Motorola (1987), GE (1995), and Texas Instruments (1988) have adopted the Six-Sigma discipline as a major business initiative. Many of these companies invested heavily in and pursued this model initially in order to create products and services that were of equal and higher quality than those of its competitors and to improve relationships with customers.

The approach was introduced and established at Motorola in 1987, becoming the key factor in Motorola winning the 1988 Malcolm Baldrige Award for Quality, and has had impressive and undisputed results for many companies who have undertaken it. Allied Signal reported an estimated savings of \$1.5 billion in its 1997 annual report while GE’s savings in a 1998 annual letter to its shareholders reported benefits exceeding \$750 million a year.

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## ***Analogy***

If you played 100 rounds of golf per year and played at:

- **2 Sigma:** You'd miss 6 putts per round (Putt: (hitting a golf ball that is on the green using a putter).
- **3 Sigma:** You'd miss 1 putt per round.
- **4 Sigma:** You'd miss 1 putt every 9 rounds.
- **5 Sigma:** You'd miss 1 putt every 2.33 years.
- **6 Sigma:** You'd miss 1 putt every 163 years!

Source: From John Petty, "When Near Enough is Not Good Enough," Australian CPA, May 2000, pp. 34–35.

## ***Method to Implementing near perfect process or service***

One such method for improving a system for existing processes falling below specification while looking for incremental improvement is the DMAIC process (define, measure, analyze, improve, control).

### **Define**

- Project Definition
- Project Charter
- Gathering Voice of the Customer
- Translating Customer Needs into Specific Requirements

### **Measure**

- Process Mapping (As-Is Process)
- Data Attributes (Continuous vs. Discrete)
- Measurement System Analysis
- Gage Repeatability and Reproducibility
- Measuring Process Capability
- Calculating Process Sigma Level

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- Visually Displaying Baseline Performance

### **Analyze**

- Visually Displaying Data (Histogram, Run Chart, Pareto Chart, Scatter Diagram)

- Value-Added Analysis

- Cause and Effect Analysis (a.k.a. Fishbone, Ishikawa)

- Verification of Root Causes

- Determining Opportunity (Defects and Financial) for

### **Improvement**

- Project Charter Review and Revision

### **Improve**

- Brainstorming

- Quality Function Deployment (House of Quality)

- Failure Modes and Effects Analysis (FMEA)

- Piloting Your Solution

- Implementation Planning

- Culture Modification Planning for Your Organization

### **Control**

- Statistical Process Control (SPC) Overview

- Developing a Process Control Plan

- Documenting the Process

### **Use Case**

#### ***The Big Picture***

In 1997 Citibank set about to apply Six-Sigma technique to its nonmanufacturing environment by contracting with Motorola University

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Consulting and Training Services for extensive Six-Sigma training. The goal was to improve Citibank operations globally through defect reduction and process timeline improvement while increasing customer loyalty and satisfaction.

Citibank's mission focused on becoming the premier international financial company in the next millennium requiring excellence in every facet of the business and action on the part of every Citibank employee. This quality initiative began with training 650 senior managers by October 1997 and over 92,000 employees trained worldwide by early 1999.

### ***Six-Sigma to the Rescue***

The initial phase of the Six-Sigma process involved Motorola University training Citibank employees on both Cycle Time Reduction (CTR) and Cross Functional Process Mapping (CFPM). These methodologies essentially set the stage for Six-Sigma by mapping and eliminating wasteful and nonvalue-added processing steps from the business. In a nonmanufacturing company, 90 percent of activities may fall into this category. A sigma is a statistical term which measures to what degree a process varies from perfection. A rating of three sigma equals 66,807 defects per million opportunities; a rating of Six-Sigma equals 3.4 defects per million opportunities, or virtual perfection.

Six-Sigma is accomplished using simple tools, including the Pareto chart. The data on the chart identify which problems occur with the greatest frequency or incur the highest cost. It provides the direct evidence of what would be analyzed and corrected first. Typically 20 percent of the possible causes are responsible for 80 percent of any problem.

Citibank undertook the Six-Sigma process to investigate why it was not achieving complete customer satisfaction with a goal to have 10 times reduction in defects and cycle time by December 2000 and 10 times again every two years. Six-Sigma classifies a defect as anything that results in customer dissatisfaction and unhappiness. Indicators of less than optimal status are customer opinions such as:

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- You're difficult to do business with;
- You don't fix my problems;
- You're not staying innovative and your systems are not state-of-the-art;
- You are slow and complicated.

### ***Team Approach***

A team composed of bankers and operations people identified the entire funds transfer process, tabulating defects and analyzing them using Pareto charts. Highest on the list of defects for this process was the internal callback procedure, which required a staffer to phone back the requester to make sure that the instructions were correct, or had not been altered. "We cut monthly callbacks from 8,000 to 1,000 and we eliminated callbacks for 73 percent of the transactions coming in," says Cherylann Munoz, compliance director of Citibank's Private Bank in the United States and Western Hemisphere.

In Citibank's Global Cash and Trade Organization (GCTO), MU's Six-Sigma methodology helped track defects and documented the results by teaching team members to identify appropriate metrics, determine a baseline, establish appropriate standards, and monitor execution. The employees formed teams to solve any issues they discovered during this analysis.

To reduce the time for opening an account, Citibank formed a cross-functional global team of 80 people. The team first identified sponsors and formed a steering committee to champion the effort. Employees were invited to participate based on their subject matter know-how and ability to assist with the solution. The biggest hurdle for Citibank employees was allocating the time to participate while juggling their daily job responsibilities. Sue Andros, a global process owner in the GCTO responsible for the end-to-end customer experience says process mapping "lets people get to know one another."

"Team members worked well together, since achieving the objectives would make their professional responsibilities easier and would benefit their

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customers—a win/win situation for everyone,” Andros says. “The focus on cycle time and deficiencies has made an impact on how we serve customers. It’s not just a matter of doing things faster, it’s doing things better. This means eliminating redundancy, minimizing hand-offs, and establishing metrics that reflect performance in the eyes of the customer.”

Dipak Rastogi, executive vice president for Citibank’s Eastern European/Central Asia and Africa region headquartered in London, agrees with those sentiments. “Introducing quality as a core strategy was viewed as a unique opportunity and differentiating feature not only with regard to our customers, but also our employees,” says Rastogi. “When implemented correctly, quality increases customer satisfaction and leads to shorter reaction time and faster introduction of new products—providing a sustainable competitive advantage.”

### ***Management Commitment***

Teams involved in the Citibank quality initiative needed to have full autonomy to make decisions about changes to the established processes. Senior management sponsored these initiatives or served on steering committees to champion the work and there was an “open door” policy so that teams could gain access to them as needed. According to Peter Klimes, quality director for Citibank in the Czech Republic, the involvement of senior support is a continuous process all the way from setting critical business issues and objectives, to the final improvement implementation. “We have had a well-balanced split between projects initiated by senior management and those initiated by employees,” Klimes says. “Our senior operations officer and our corporate bank head were our most active supporters of Six-Sigma projects. Their commitment helps balance back and front office aspects of projects.”

**Source:** “Citibank Increases Loyalty with Defect-Free Processes,” *The Journal for Quality & Participation*, Fall 2000, pp. 32–36.

### ***Summary***

Six-Sigma programs promote an uncompromising orientation of all business processes toward the customer. The first step is always achieving an

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understanding of customer expectations so that suitable tools can be employed to improve both the internal and external processes. This program does not come fast and cheap; however, management commitment is crucial to the success, and employees must be trained in Six-Sigma methodologies.

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